



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005NJ82B

Title: Examining Effects of Soil Compaction on Pollutant Removal Efficiency and Lifespan of a NJ Approved Stormwater Best Management Practice

Project Type: Research

Focus Categories: Water Quality, Water Quantity, Surface Water

Keywords: BMPs, stormwater, soil compaction, water quality, bioretention, infiltration

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Congressional District: 6

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Abstract

A variety of BMPs are available to mitigate impacts of stormwater. The bioretention system, which is considered to be an alternative to conventional BMP structures such as stormwater wetlands or riparian forest buffers, is common to suburban settings, for the treatment of runoff from impervious surfaces.

The design of a bioretention system must account for soil compaction within the basin. Compaction in soil influences plant growth in multiple dimensions, primarily based on the degree of compaction. High levels of soil compaction result in high soil bulk densities to a degree at which plant roots are hindered from penetrating the soil. Due to the high bulk density of compacted soils, filtration rates through the soil media are reduced, causing excessive runoff through the system, and therefore affecting the efficiency of bioretention BMPs.

This research seeks to determine the ideal degree of soil compaction to optimize pollution removal efficiency of bioretention systems, to confirm the effects of soil compaction on

the lifespan of bioretention systems through soil column studies, and to contribute to the overall stormwater knowledge-base through conference presentation(s), journal articles, and discussions. The experiment procedure infers creating compacted soil columns to model a bioretention system.